

CLAIMS

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1 A router controlling congestion on links attached to the router, comprising:  
2 a plurality of ports;  
3 a first port of said plurality of ports for receiving a data packet;  
4 a second port of said plurality of ports for transmitting said data packet; -  
5 a receiver to receive an incoming loss report message on said second port; ~  
6 a first processor to determine loss of packets on selected ports of said plurality of  
7 ports;  
8 a second processor to calculate, in response to said loss report and said loss of  
9 packets, a loss rate statistic;  
10 a transmitter to transmit an outgoing loss report message through said first port,  
11 said outgoing loss report message containing a field having said loss rate statistic written  
12 therein.

1 2. The apparatus as in claim 1 wherein said first processor and said second processor are  
2 the same processor.

1 3. The apparatus as in claim 1 wherein said first processor and said second processor are  
2 different processors.

1 4. The apparatus as in claim 1 wherein said loss rate statistic is a largest loss rate deter-  
2 mined by said router.

1 5. The apparatus as in claim 1 wherein said loss rate statistic is a time averaged loss rate.

1 6. The apparatus of claim 1, further comprising:  
2 a linecard supporting at least one of said plurality of ports, said linecard  
3 having a linecard processor and a memory mounted thereon, said linecard processor  
4 computing said loss of packets.

1 7. The apparatus of claim 1, further comprising: said loss report is carried in a NAK  
2 packet.

1 8. The apparatus of claim 1, further comprising: said loss report message is transmitted  
2 by said router in response to the router receiving a loss report message from a down-  
3 stream router.

1 9. The apparatus of claim 1, further comprising: said loss report message is transmitted  
2 by said router in response to the router receiving a loss report message from a target re-  
3 ceiver station.

1 10. The apparatus of claim 1, further comprising: said loss report message is periodi-  
2 cally transmitted by said router.

1 11. The apparatus of claim 1, further comprising:  
2 a central processor (CPU) forwarding engine, said CPU forwarding engine deter-  
3 mining which port said loss report message is to be transmitted out through.

1 12. The apparatus as in claim 1, further comprising:  
2 a central processor (CPU) control engine, said CPU control engine generating said  
3 loss report message.

1 13. A method for operating a router, comprising:  
2 receiving a multicast group data packet at a first port;  
3 transmitting a replica of said multicast data packet from a second port;  
4 receiving an incoming loss report message on said second port;  
5 computing a loss of packets on selected ports of said router;  
6 calculating, in response said loss report and said loss of packets, a loss rate statis-  
7 tic;

8 transmitting an outgoing loss report message through said first port, said outgoing  
9 loss report message containing said loss rate statistic in a field of said outgoing  
10 loss report message.

1 14. The method of claim 13, further comprising:

2 choosing said loss rate statistic as a largest packet loss rate determined by said  
3 router.

1 15. The method of claim 13, further comprising:

2 choosing said loss rate statistic as a time averaged packet loss rate as determined  
3 by said router.

1 16. The method of claim 13, further comprising:

2 selecting said selected ports as members of a multicast group distribution tree.

1 17. The method of claim 13, further comprising:

2 determining a loss rate statistic which has not expired at "at least one", port of  
3 said router, where said at least one port includes all ports of a multicast group distribution  
4 tree of said multicast group;

5 writing said loss rate statistic into said outgoing loss report packet and before  
6 transmitting said loss report packet.

1 18. The method of claim 13, further comprising: transmitting said outgoing loss report  
2 packet as a NAK packet.

1 19. The method of claim 13, further comprising: transmitting said outgoing loss report  
2 packet in response to receiving said incoming loss report packet.

1 20. The method of claim 13, further comprising: transmitting said outgoing loss report  
2 packet periodically.

1 21. The method of claim 13, further comprising: transmitting said outgoing loss report  
2 message as a unicast message to the next upstream router capable of responding to said  
3 loss report message.

1 22. The method of claim 13 further comprising: transmitting said outgoing loss report  
2 message as a multicast message.

1 23. A router, comprising:

2 means for receiving a multicast group data packet at a first port;  
3 means for transmitting a replica of said multicast data packet from a second port;  
4 means for receiving an incoming loss report message on said second port;  
5 means for computing a loss of packets on selected ports of said router;  
6 means for calculating, in response said loss of packets, a loss rate statistic;  
7 transmitting an outgoing loss report message through said first port, said outgoing  
8 loss report message containing said loss rate statistic in a field of said outgoing loss re-  
9 port message.

1 24. A computer readable media having instructions written thereon for practicing the  
2 method of claim 13.

1 25. Electromagnetic signals carried on a computer network, said electromagnetic signals  
2 carrying instructions for practicing the method of claim 13.